

ANNUAL ACTIVITY OF A POPULATION OF *CATASARCUS ASPHALTINUS* THOMPSON (COLEOPTERA: CURCULIONIDAE) IN PERTH, WESTERN AUSTRALIA

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**Abstract**

A study of a population of the indigenous leaf-eating weevil *Catasarcus asphaltinus* during 40 weeks in a Perth garden showed that adults were active mainly between August and May. Peak abundance was in January, before average weekly maximum temperatures exceeded 30°C. Peak reproductive activity, evidenced by pairs in copula, was also recorded in January. Longevity could not be precisely estimated; however some individuals lived at least 33 weeks. The preferred host species was *Eucalyptus angulosa* Schauer, one of 5 species of native plant on which beetles were recorded.

**Introduction**

The 41 species of the weevil genus *Catasarcus* Schönherr are largely confined to temperate portions of Western Australia (Thompson 1968). Despite their extensive distribution, little ecological, behavioural and reproductive information is available (Thompson 1968; Koch and Jefferys 1970). The discovery of an abundant population of *C. asphaltinus* in a garden provided an opportunity to add to our knowledge. Previously, this species was recorded as a minor pest in gardens in the Perth area (Thompson 1968). *C. asphaltinus* is a relatively large (10-20 mm long), black weevil with red legs and antennae (see Thompson 1968, p. 410 for illustration). The aim of the project was simply to mark and record all individuals present in a well-defined, highly accessible locality at least weekly. Relevant behavioural notes were made. These data are presented in this paper.

**Methods**

The study area was a small garden ca. 35 m<sup>2</sup> in West Leederville, an inner suburb of Perth. Before 1977 it consisted of lawn and exotic plants. In that year most vegetation was removed and a garden of native plant species was established. The soil was covered by leaf litter and pine bark. The major shrub/small tree species present in the garden are one each of *Eucalyptus angulosa* Schauer, *Hakea petiolaris* Meisn., *Melaleuca huegelii* Endl., *Agonis flexuosa* (Spreng.) Schauer, *Kunzea baxteri* (Klotsch) Schauer and *Citharexylum* sp. and two *Grevillea banksii* R.Br., as well as the climbers *Hardenbergia comptoniana* (Andr.) Benth. and *Bougainvillea* sp. and there are a few small clumps of small shrubs. The garden is watered at least weekly during summer. Between August 1986 and May 1987 all adults of *C. asphaltinus* found in the study area were marked with typist's white correction fluid. The number of adults present was recorded every 1 to 3 days depending on season, apart from rare occasions when the interval was 5 days. The number of copulating pairs and the identity

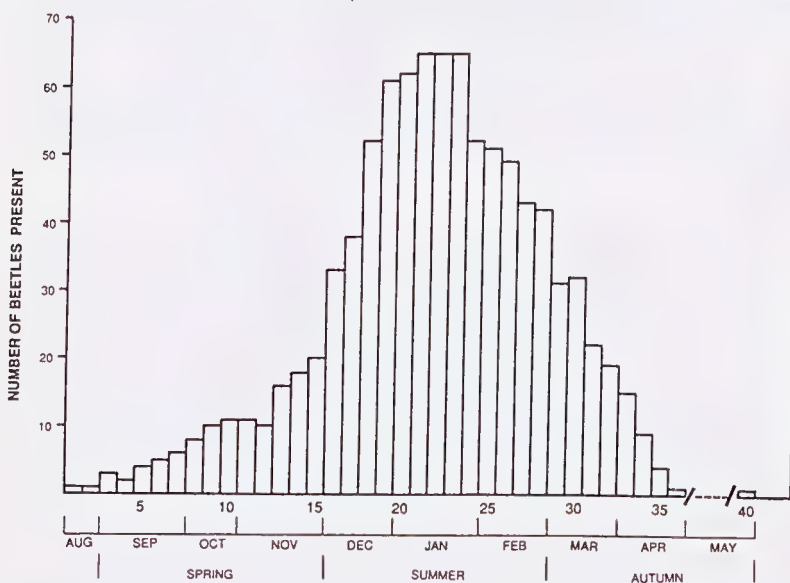
of plant species on which beetles were observed was recorded. Data were tabulated on a weekly basis, Saturday to Friday.

### Results and Discussion

The number of beetles present in the study area (Fig. 1) increased exponentially between August 1986 and January 1987, reaching a maximum of 65. This was just before the weekly mean maximum temperature consistently exceeded 30°C (Fig. 2). The population then declined linearly (at a rate of 5 individuals/week) to near zero in May 1987. The period May to August is the wettest and coldest part of the year (min 10°C, max 20°C, weekly rainfall 0-75 mm).

A maximum population density of nearly two *Catasarcus* beetles/m<sup>2</sup> (65/35m<sup>2</sup>) is unusually high in south-western Australia. Throughout the jarrah forest, *Catasarcus* species are uncommon and usually recorded singly (Abbott, unpublished data). However I do know of a population (tentatively identified as *C. coruscus* Thompson) occurring at comparable high densities, on Jarrah *Eucalyptus marginata* Donn ex Sm., in Quinup forest block, south of Manjimup.

Although no adults were found before late August 1986 or between May - July 1987, casual observations after May 1987 revealed the presence of 3 beetles marked in August and September 1986. Thus, not all adults die before May. As no adults were seen on foliage after May, it is assumed that over-wintering takes place on or in the soil.



**Fig. 1.** Number of beetles recorded weekly during a 40 week period beginning 23 August 1986. Up to week 21, the power equation  $\log_{10} N = 1.5 \log_{10} t - 0.4$  provides a very good fit ( $r = 0.95$ ). From week 23 to week 35, the linear equation  $N = 162.3 - 4.6t$  provides the best fit ( $r = -0.99$ ).

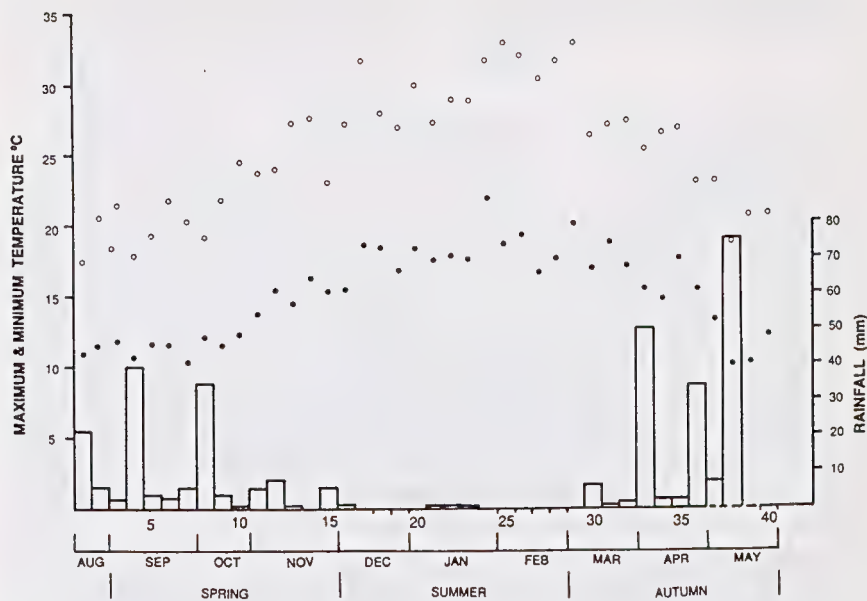


Fig. 2. Weather details, calculated on a weekly basis for Perth Regional Meteorological Office, for the 40 week period beginning 23 August 1986.

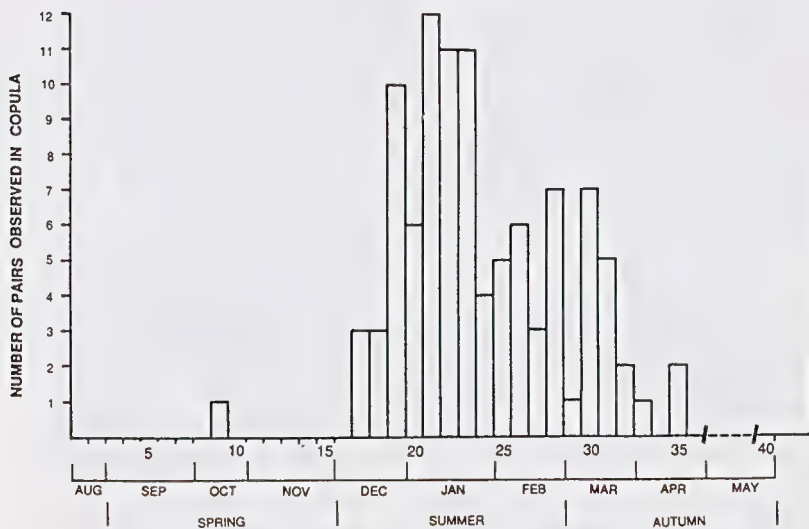


Fig. 3. Number of pairs of beetles observed in copula each week during a 40 week period beginning 23 August 1986.

**Table 1.** Apparent longevity of adult beetles, grouped into 4 equal periods according to when the beetles were first recorded

Period first recorded	Number of weeks seen alive		Number of beetles
	Median	Range	
20.viii.86 - 25.x.86 incl.	17.5	1-33	12
1.xi.86 - 3.i.87 incl.	6.0	1-18	74
10.i.87 - 14.iii.87 incl.	4.0	1-18	43
28.iii.87 - 30.v.87 incl.	-	1-3	2

Survivorship of beetles was analysed in four 10 week periods (Table 1). Beetles first recorded in the period August - October 1987 were seen alive for the longest period (up to 33 weeks, Table 1).

Reproductive activity, evidenced by beetles in copula, was first recorded in October 1986 and then consistently from December 1986 to April 1987. Most pairing was recorded during January 1987 (Fig 3).

Comparison of Figs 2 and 3 showed that copulation was observed mostly during the rainless part of the year. Koch and Jefferys (1970) recorded first instar larvae of *C. asphaltinus* in April 1969, suggesting that the larval period of the life cycle may last 5 months or more. Egg clusters have been found about 1 cm beneath the soil surface (Sundstrom, in Thompson 1968). Egg development (in April 1969) took 14 - 24 days (Koch and Jefferys 1970).

Host records for adults were as follows: *Eucalyptus angulosa* 505 records; *Hakea petiolaris* 188; *Agonis flexuosa* 29; *Melaleuca huegelii* 10; and *Grevillea banksii* 3. There was no sign of feeding on the last two species. Beetles feed on the leaf margin and in extreme cases the margin may be totally crenellated. However, the population of 131 beetles studied had no significant impact on any of the plant species observed. Previous host records are *Casuarina* sp. and *Banksia* sp. (Thompson 1968).

Beetles are flightless, and I can confirm Thompson's (1968) discussion of beetles dropping to the ground when disturbed and lying motionless for several minutes. They are then virtually impossible to relocate. They are strong walkers; one climbed a 3 m tall tree in 20 minutes.

### Acknowledgments

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### References

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